

**REMARKS**

Prior to the present amendment and response, claims 24-26 and 28-48 were pending in the present application. By the present amendment and response, independent claims 24, 31, and 37 have been amended to overcome the Examiner's objections. Claims 24-26 and 28-48 remain in the present application. Reconsideration and allowance of pending claims 24-26 and 28-48 in view of the above amendments and the following remarks are requested.

**A. Rejection of Claims 24-26, 28, 31-34, 37, 39-43, and 48 under 35 USC §102(e)**

The Examiner has rejected claims 24-26, 28, 31-34, 37, 39-43, and 48 under 35 USC §102(e) as being anticipated by U.S. patent number 6,013,939 to El-Sharawy et al. (hereinafter "El-Sharawy"). For the reasons discussed below, Applicants respectfully submit that the present invention, as defined by amended independent claims 24, 31, and 37, is patentably distinguishable over El-Sharawy.

The present invention, as defined by amended independent claim 24, recites, among other things, a conductor patterned in a second area of a dielectric, where a permeability conversion material is interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first area of the dielectric is not situated underneath the second area of the dielectric and not situated over the second area

of the dielectric. As disclosed in the present application, a mask covers a first area of a dielectric when a permeability conversion material is interspersed within a second area of the dielectric. As a result, only the permeability of the second area of the dielectric is increased by the permeability conversion material. As disclosed in the present application, the first area of the dielectric is situated adjacent to the second area of the dielectric and the first area of the dielectric is not situated underneath or over the second area of the dielectric.

By masking a particular area (i.e. a first area) of a dielectric and preventing permeability conversion material from being interspersed in that area, the present invention advantageously achieves control over the particular area (i.e. a second area) of the dielectric in which to intersperse the permeability conversion material. For example, the permeability conversion material can be interspersed in a desired area of the dielectric that includes an inductor while preventing the permeability conversion material from being interspersed in an adjacent area of the dielectric.

Additionally, by interspersing the permeability conversion material within the second area of the dielectric, the amount of permeability conversion material can be advantageously controlled to achieve a desired increase in the permeability of the second area of the dielectric. Thus, since increasing the permeability of the second area of the dielectric increases the inductance of the inductor patterned there (i.e. in the second area), the present invention advantageously allows the inductance of an on-chip inductor to be increased without increasing the size of the inductor.

In contrast to the present invention as defined by amended independent claims 24, El-Sharawy does not teach, disclose, or suggest a conductor patterned in a second area of a dielectric, where a permeability conversion material is interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first area of the dielectric is not situated underneath the second area of the dielectric and not situated over the second area of the dielectric. El-Sharawy specifically discloses inductor 20 including center coil region 36, which includes insulative layer 30, magnetic material layer 32 situated on insulative layer 30, and insulative layer 34 situated in magnetic material layer 32. See, for example, column 1, lines 56-67, column 2, lines 1-36, and Figure 1 of El-Sharawy.

In El-Sharawy, conductive plugs 38 extend through center coil region 36 and electrically contact conductive layer 28 situated below center coil region 36 and conductive layer 40 situated above center coil region 36. See, for example, column 4, lines 64-67, column 5, lines 1-9, and Figure 1 of El-Sharawy. Thus, in El-Sharawy, magnetic material layer 32 is situated below insulative layer 34 and above insulative layer 30. Thus, El-Sharawy fails to teach, disclose, or remotely suggest a conductor patterned in a second area of a dielectric, where a permeability conversion material is interspersed within the second area of the dielectric such that the permeability of the second area of the dielectric is higher than the permeability of a first area of the dielectric, where the first area of the dielectric is not situated underneath the second area of the dielectric and not

situated over the second area of the dielectric, as specified in amended independent claim 24.

For the foregoing reasons, Applicants respectfully submit that the present invention, as defined by amended independent claim 24, is not taught, disclosed, or suggested by El-Sharawy. Thus, amended independent claim 24 is patentably distinguishable over El-Sharawy. As such, claims 25, 26, and 28 depending from amended independent claim 24 are, *a fortiori*, also patentably distinguishable over El-Sharawy for at least the reasons presented above and also for additional limitations contained in each dependent claim.

The present invention, as defined by amended independent claim 31, recites, among other things, an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric. The present invention, as defined by amended independent claim 31, provides similar advantages as discussed above in relation to the present invention as defined by amended independent claim 24.

In contrast, El-Sharawy does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal

turns are not situated underneath the dielectric and not situated above the dielectric. As discussed above, in El-Sharawy, conductive plugs 38 extend through center coil region 36, which includes insulative layer 30, magnetic material layer 32, and insulative layer 34, and electrically contact conductive layer 28 situated below center coil region 36 and conductive layer 40 situated above center coil region 36. Thus, in El-Sharawy, only conductive plugs 38 extend through insulative layer 30, magnetic material layer 32, and insulative layer 34. Thus, El-Sharawy fails to teach, disclose, or remotely suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric, as specified in amended independent claim 31.

For the foregoing reasons, Applicants respectfully submit that the present invention, as defined by amended independent claim 31, is not taught, disclosed, or suggested by El-Sharawy. Thus, amended independent claim 31 is patentably distinguishable over El-Sharawy. As such, claims 32-34 depending from amended independent claim 31 are, *a fortiori*, also patentably distinguishable over El-Sharawy for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Amended independent claim 37 recites similar limitations as amended independent claim 24. Thus, for similar reasons as discussed above, amended independent claim 37 is

also patentably distinguishable over El-Sharawy. As such, claims 39-43 and 48 depending from amended independent claim 37 are, *a fortiori*, also patentably distinguishable over El-Sharawy for at least the reasons presented above and also for additional limitations contained in each dependent claim.

**B. Rejection of Claims 29-30, 35-36, 38, and 44-47 under 35 USC §103(a)**

The Examiner has rejected claims 29-30, 35-36, 38, and 44-47 under 35 USC §103(a) as being unpatentable over El-Sharawy. As discussed above, amended independent claims 24, 31, and 37 are patentably distinguishable over El-Sharawy. As such, claims 29-30 depending from amended independent claim 24, claims 35-36 depending from amended independent claim 31, and claims 38 and 44-47 depending from amended independent claim 37 are, *a fortiori*, also patentably distinguishable over El-Sharawy for at least the reasons presented above and also for additional limitations contained in each dependent claim.

**C. Rejection of Claims 30, 36, and 47 under 35 USC §103(a)**

The Examiner has rejected claims 30, 36, and 47 under 35 USC §103(a) as being unpatentable over El-Sharawy in view of Japanese patent number JP 402262308A by Tetsuya Yokogawa (hereinafter "Yokogawa"). As discussed above, amended independent claims 24, 31, and 37 are patentably distinguishable over El-Sharawy. As such, claim 30 depending from amended independent claim 24, claim 36 depending from

amended independent claim 31, and claim 47 depending from amended independent claim 37 are, *a fortiori*, also patentably distinguishable over El-Sharawy for at least the reasons presented above and also for additional limitations contained in each dependent claim.

**D. Rejection of Claims 31-36 under 35 USC §103(a)**

The Examiner has rejected claims 31-36 under 35 USC §103(a) as being unpatentable over Yokogawa in view of U.S. patent number 6,069,397 to Cornett et al. (hereinafter "Cornett") and U.S. patent number 5,446,311 to Ewen et al. (hereinafter "Ewen"). For the reasons discussed below, Applicants respectfully submit that the present invention, as defined by amended independent claim 31, is patentably distinguishable over Yokogawa, Cornett, and Ewen, singly or in any combination thereof.

In contrast to the present invention as defined by amended independent claim 31, Yokogawa does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric. Yokogawa specifically discloses inductor 2, which includes spiral type coil 3 sandwiched between insulating layers 4. See, for example, the constitution and Figures 1 and 2 of Yokogawa. Thus, in Yokogawa, spiral type coil 3 is situated between insulating layers 4.

Also, in Yokogawa, high permeability magnetic substance 5 is situated above one of insulating layers 4 and high permeability magnetic substance 6 is situated underneath one of insulating layers 4. See, for example, the constitution and Figure 2 of Yokogawa. Furthermore, in Yokogawa, the dielectric area in which spiral type coil 3 is patterned (indicated by the white area situated between windings of spiral type coil 3) is situated between insulating layers 4. Thus, Yokogawa fails to teach, disclose, or remotely suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric, as specified in amended independent claim 31.

In contrast to the present invention as defined by amended independent claim 31, Cornett does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric. Cornett specifically discloses inductor layer 220 including patterned conductive trace 110, which is embedded within magnetic material layers 221 and 223. See, for example, column 2, lines 18-21 and Figure 2 of Cornett. Thus, in Cornett, magnetic material layer 223, which comprises an insulative



magnetic material, is situated over patterned conductive trace 110. Thus, Cornett fails to cure the basic deficiencies of Yokogawa as discussed above.

In contrast to the present invention as defined by amended independent claim 31, Ewen does not teach, disclose, or suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric. Ewen is cited by the Examiner to teach a passivation/dielectric layer comprising silicon oxide. However, Ewen fails to teach, disclose, or remotely suggest an inductor comprising a conductor patterned in a dielectric having a first permeability and a permeability conversion material having a second permeability interspersed within the dielectric, where the conductor comprises a plurality of metal turns, and where the plurality of metal turns are not situated underneath the dielectric and not situated above the dielectric, as specified by amended independent claim 31. Thus, Ewen combined with Cornett fails to overcome the deficiencies of Yokogawa as discussed above.

For the foregoing reasons, Applicants respectfully submit that the present invention as defined by amended independent claim 31 is not suggested, disclosed, or taught by Yokogawa, Cornett, and Ewen, singly, or in any combination thereof. Thus, amended independent claim 31 is patentably distinguishable over Yokogawa, Cornett, and Ewen. As such, claims 32-36 depending from amended independent claim 31 are, a

Attorney Docket No.: 00CON122P-DIV1

*fortiori*, also patentably distinguishable over Yokogawa, Cornett, and Ewen for at least the reasons presented above and also for additional limitations contained in each dependent claim.

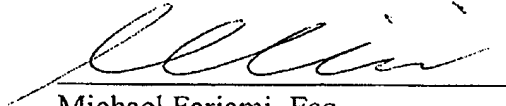
**E. Conclusion**

Based on the foregoing reasons, the present invention, as defined by amended independent claims 24, 31, and 37 and claims depending therefrom, is patentably distinguishable over the art cited by the Examiner. Thus, claims 24-26 and 28-48 pending in the present application are patentably distinguishable over the art cited by the Examiner. As such, and for all the foregoing reasons, an early allowance of claims 24-26 and 28-48 pending in the present application is respectfully requested.

Attorney Docket No.: 00CON122P-DIV1

Respectfully Submitted,  
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